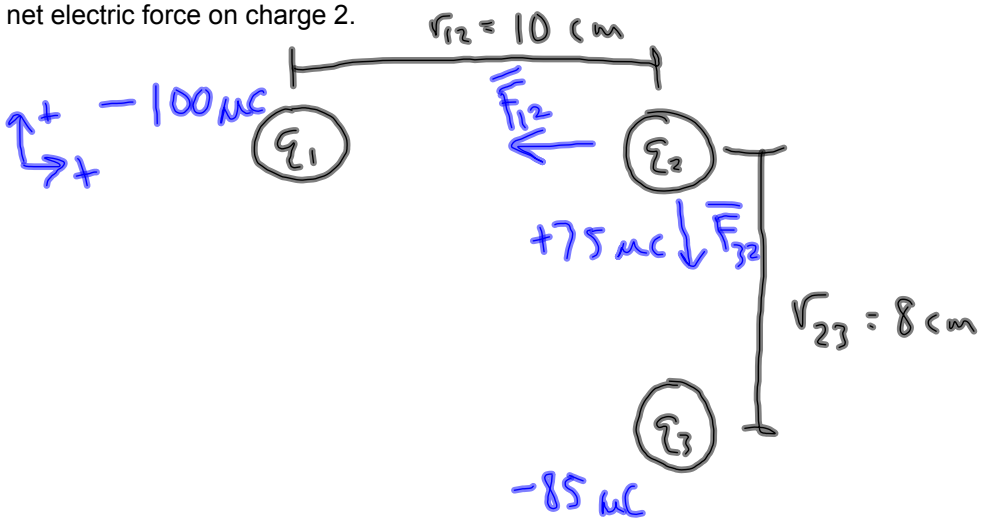
Quiz Friday, 11/11

HW: p. 583: 38, 43, 46

Electrostatics Practice Problems and Notes 1st Block 11.9.11

Three charges are arranged in a right triangle. Charge 1 has a value of -100 microC, charge 2 has a value of +75 microC, and charge 3 has a value of -85 microC. Find the net electric force on charge 2.



$$\Sigma \bar{F}_x = \bar{F}_{12x} + \cancel{\bar{F}_{32x}}^{\,0}$$

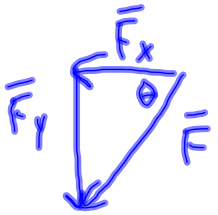
$$= -\frac{k|q_1||q_2|}{r_{12}^2}$$

$$= -6743\ N$$

$$\Sigma \bar{F}_y = \cancel{\bar{F}_{12y}}^{\,0} + \bar{F}_{32y}$$

$$= -\frac{k|q_3||q_2|}{r_{23}^2}$$

$$= -8955\ N$$

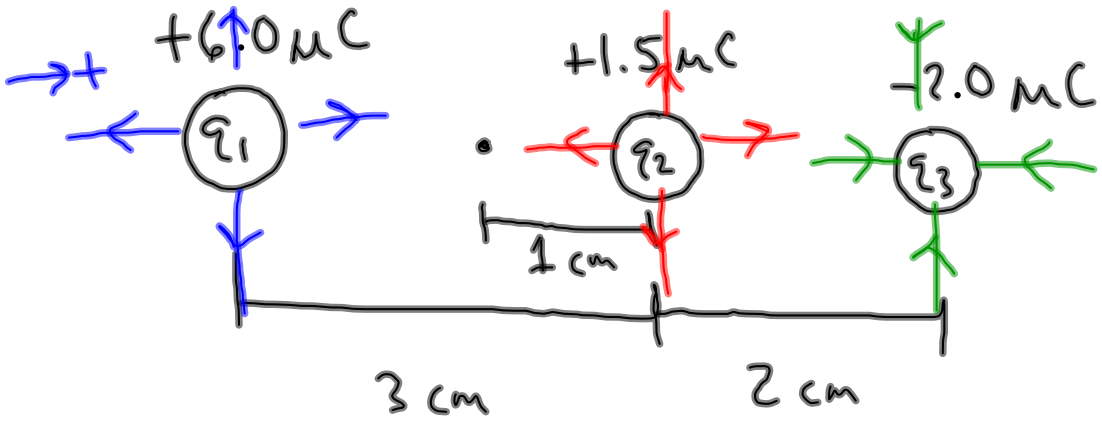


$F = 11209\ N$

$\theta = 53°$

S of W

Consider three charges arranged below.
a) What is the electric field strength at a point 1.0 cm to the left of the middle charge?
b) What is the magnitude of the force on a -2.0 microC charge placed at this point?



a) $\Sigma \bar{E} = \bar{E}_1 + \bar{E}_2 + \bar{E}_3$

$= k\left(\frac{|q_1|}{r_1^2} + \frac{-|q_2|}{r_2^2} + \frac{|q_3|}{r_3^2}\right)$

$= k\left[\frac{(6E\text{-}6\,C)}{(.02\,m)^2} - \frac{(1.5E\text{-}6\,C)}{(.01\,m)^2} + \frac{(2.0E\text{-}6\,C)}{(.03\,m)^2}\right]$

$= 1.99E7\ N/C$

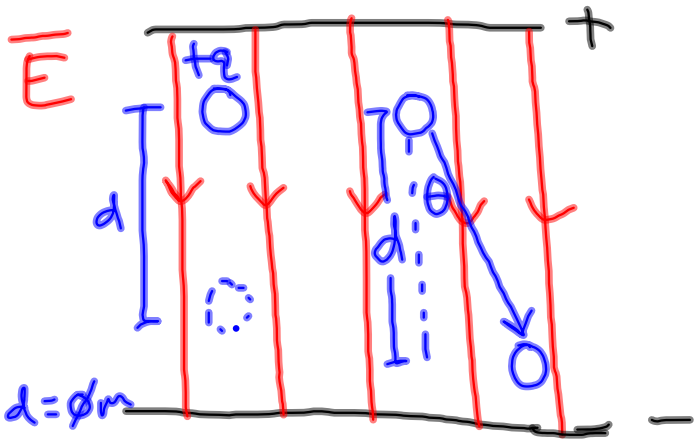
b) $\bar{E} = \frac{\bar{F}}{|q|}$

$\bar{F} = |q|\bar{E}$

$= (2E\text{-}6\,C)(1.99E7\ N/C)$

$= 39.8\ N$

- Electric Potential Energy:



$$\Delta U_e = -qEd$$

- Electric Potential Difference

(Potential, Potential Difference, Voltage)

$$\Delta V = \frac{\Delta U_e}{q} = \frac{-qEd}{q} = -Ed$$

↳ electric potential difference

Units: $1\ V = 1\ J/C$

Volts

- Current:
  - flow of e^-
  - $I = \frac{\Delta q}{\Delta t}$ → Δq: change in charge; Δt: change in time
    - I → current
  - Units: $1\,A = 1\,\frac{C}{s}$
    - Ampere (Amps)
  - We measure with ammeter.
- Resistance:
  - Amount that a material impedes flow of e^-.
  - Measure in Ohms (Ω).